

ANKLE ARTHRODESIS

Discussion, technical tips, your
problems ?

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HALLEUX

Integra™ Ankle Days

Ankle and Hindfoot Training

May 09th & 10th 2014 – Brussels, Belgium

J. de Halleux

Ankle arthrodesis - Indications

- Arthritis
 - Primitive
 - Post-traumatic
 - Rheumatoid
 - Post-infectious
- Avascular necrosis of the talus/tibia
- Neurologic condition with high degree of ankle instability, not braceable



Podiatric Medicine and Surgery © 2001 Primal Pictures Ltd

Ankle positioning: crucial

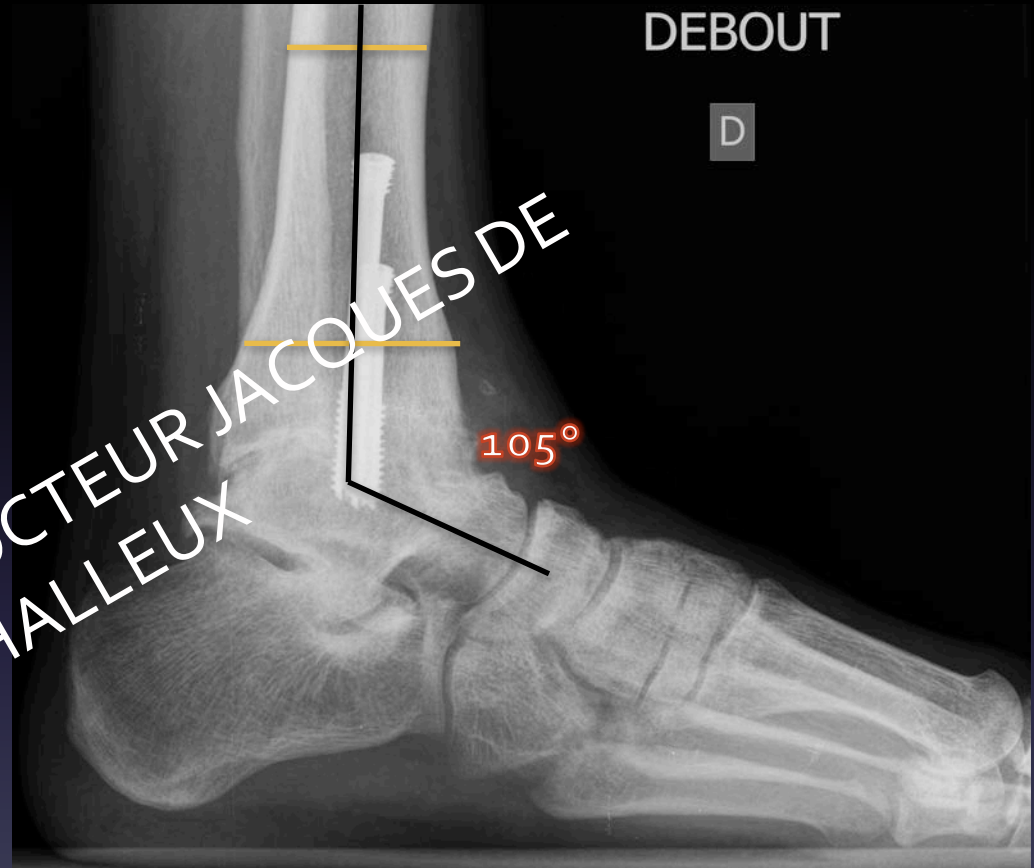
- Forefoot perpendicular to the long axis of the tibia (neutral position)
 - Plantar flexion leads to:
 - genu recurvatum
 - excessive loading of tarsal joints
- Exceptions:
 - weak quadriceps (polio) with recurvatum of the knee
 - fixed forefoot equinus

(Buck P, Morrey BF, The optimum position of arthrodesis of the ankle. A gait study of the knee and ankle. JBJS Am, 69 (7):1052-62, 1987)

Tibiotalar angle on a standing lateral radiograph

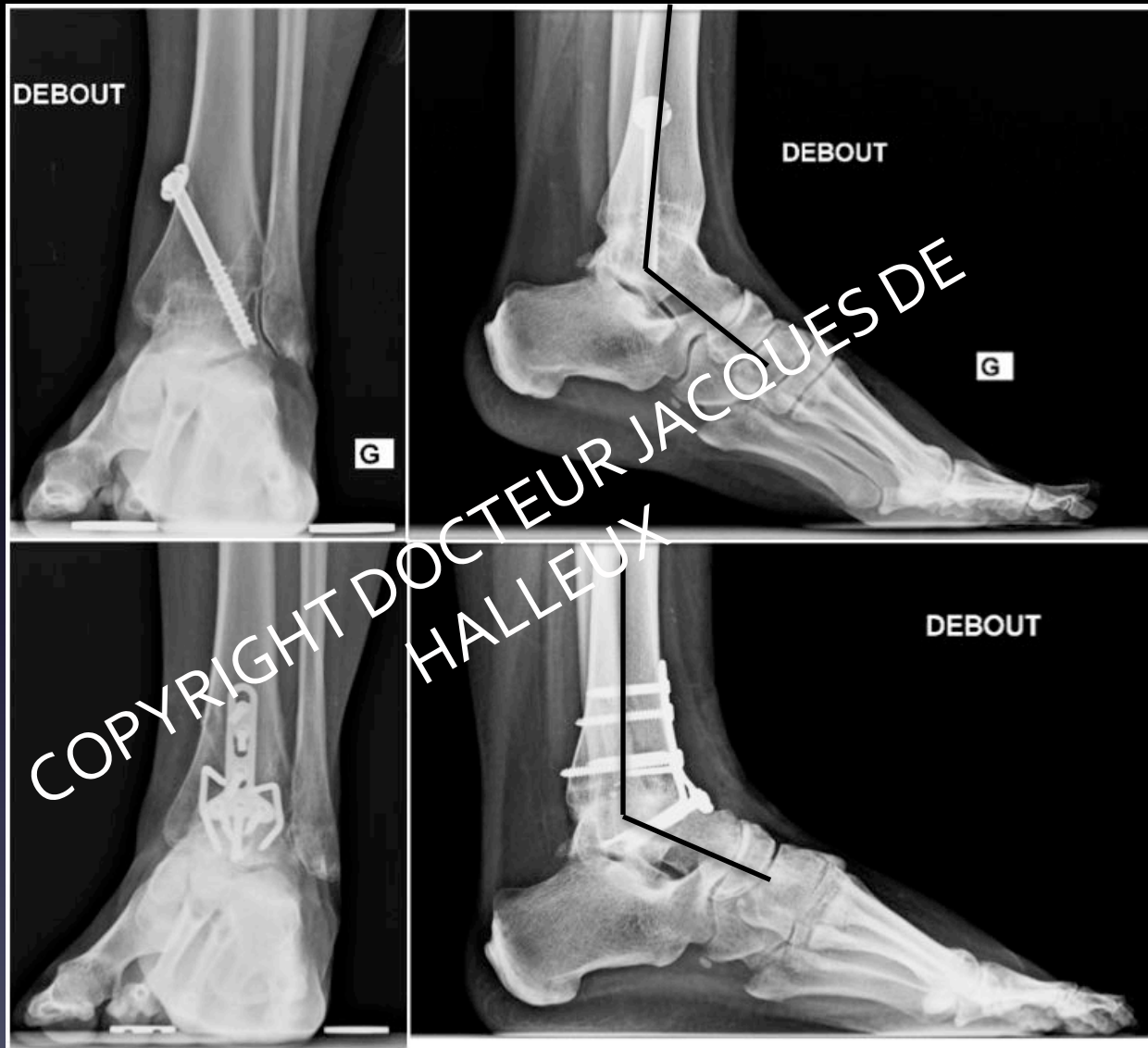
The mean and median tibiotalar angles, measured on a standing lateral radiograph of the foot and ankle, were both 114° (range, 98° to 141°)

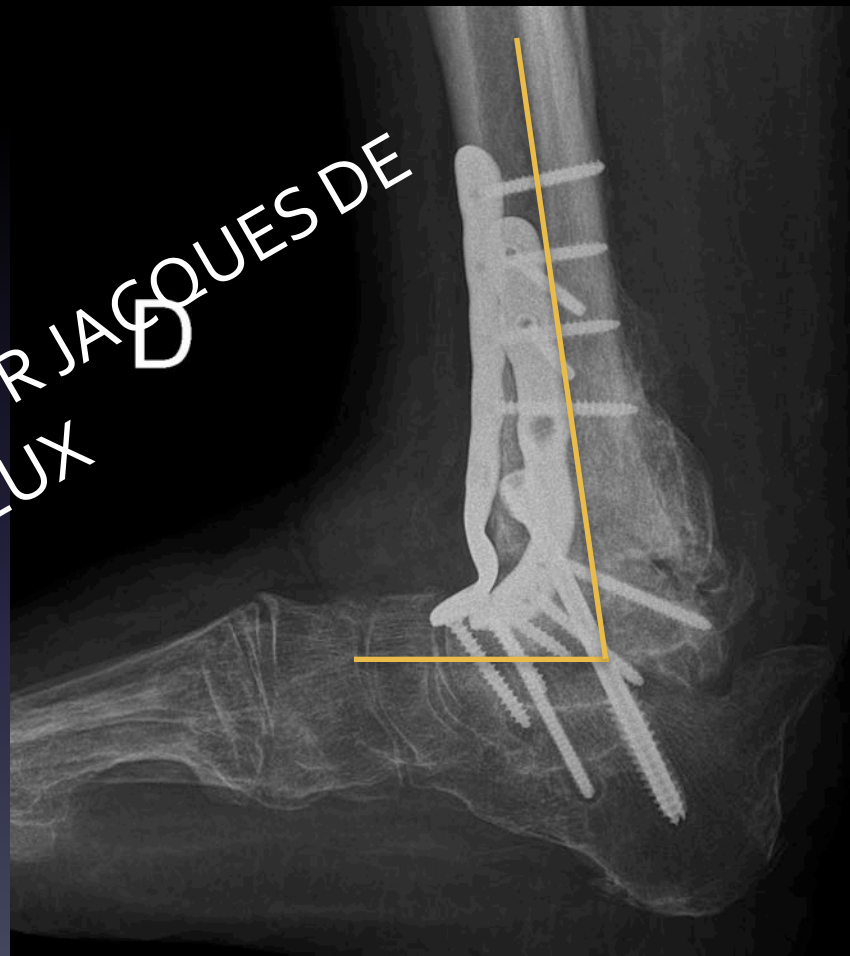
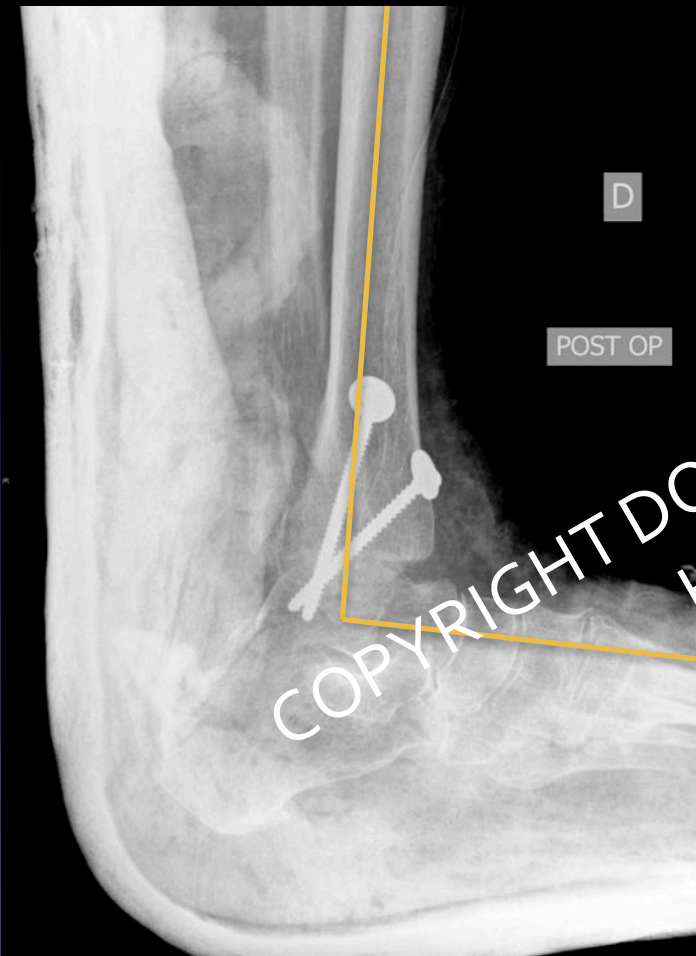
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Coester

Tibiotalar angle on a standing lateral radiograph





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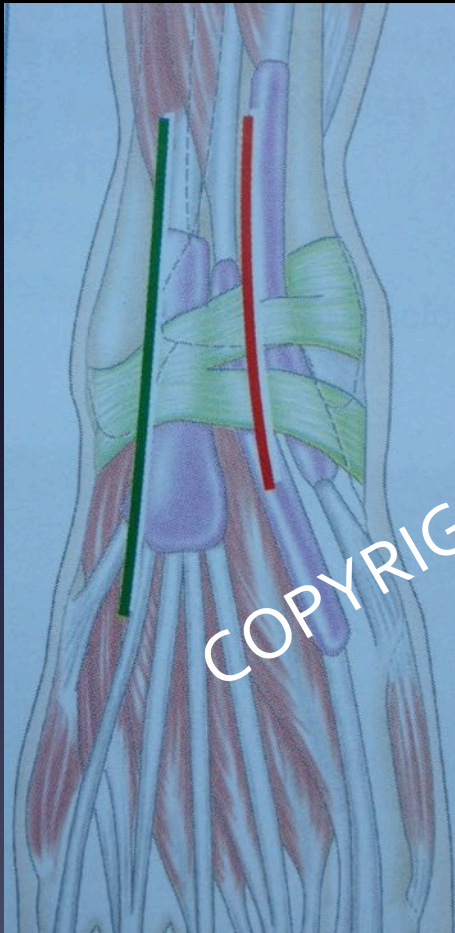
Ankle positioning

- Hindfoot valgus: 5°
 - varus leads to locking of the transverse tarsal joint, making a rigid forefoot
 - normal gait, especially on uneven ground
- External rotation: $5 - 10^{\circ}$
- Posterior displacement of the talus under the tibia
 - produce a more normal pattern of gait and decreasing of the stress at the knee.

- Buck P, Morrey BF, The optimum position of arthrodesis of the ankle. A gait study of the knee and ankle. *JBJS Am*, 69 (7):1052-62, 1987

- McGarvey WC, *Foot Ankle Int*, 19 (6): 363, 1998

WHICH SURGICAL APPROACH ?



ANTERIOR APPROACH

Anterolateral (Méary)

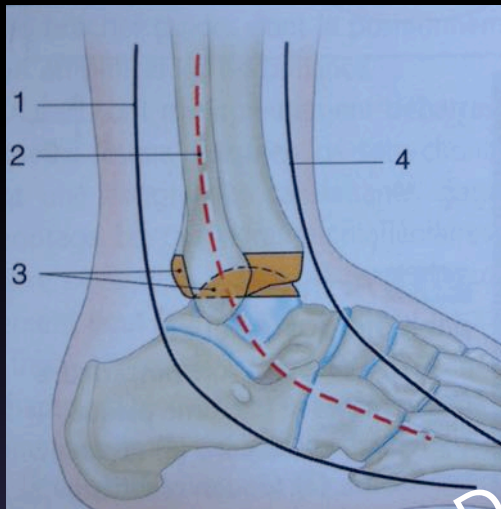
- good TT anterior exposure
- posttrauma arthritis

Anteromedial (vascular risk)

- anterior plate

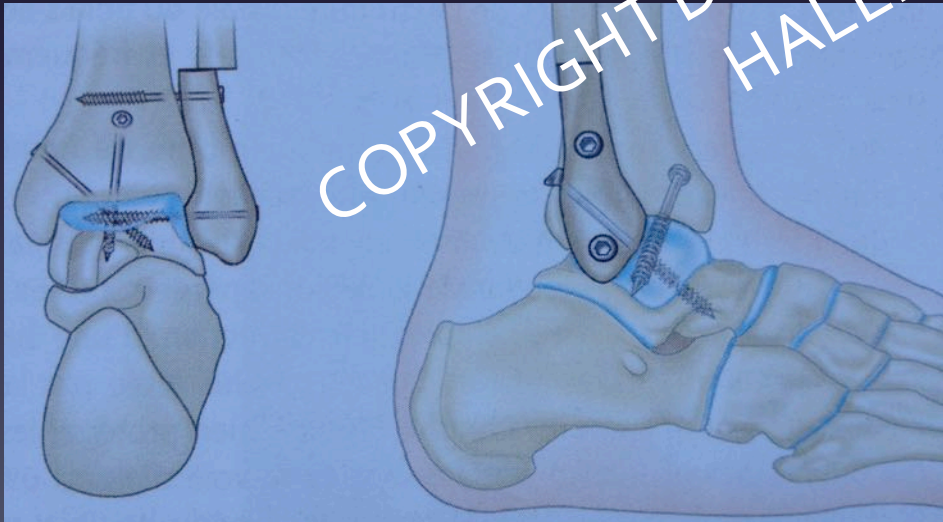
Dubble (Maurer, Kopp)

SURGICAL APPROACH



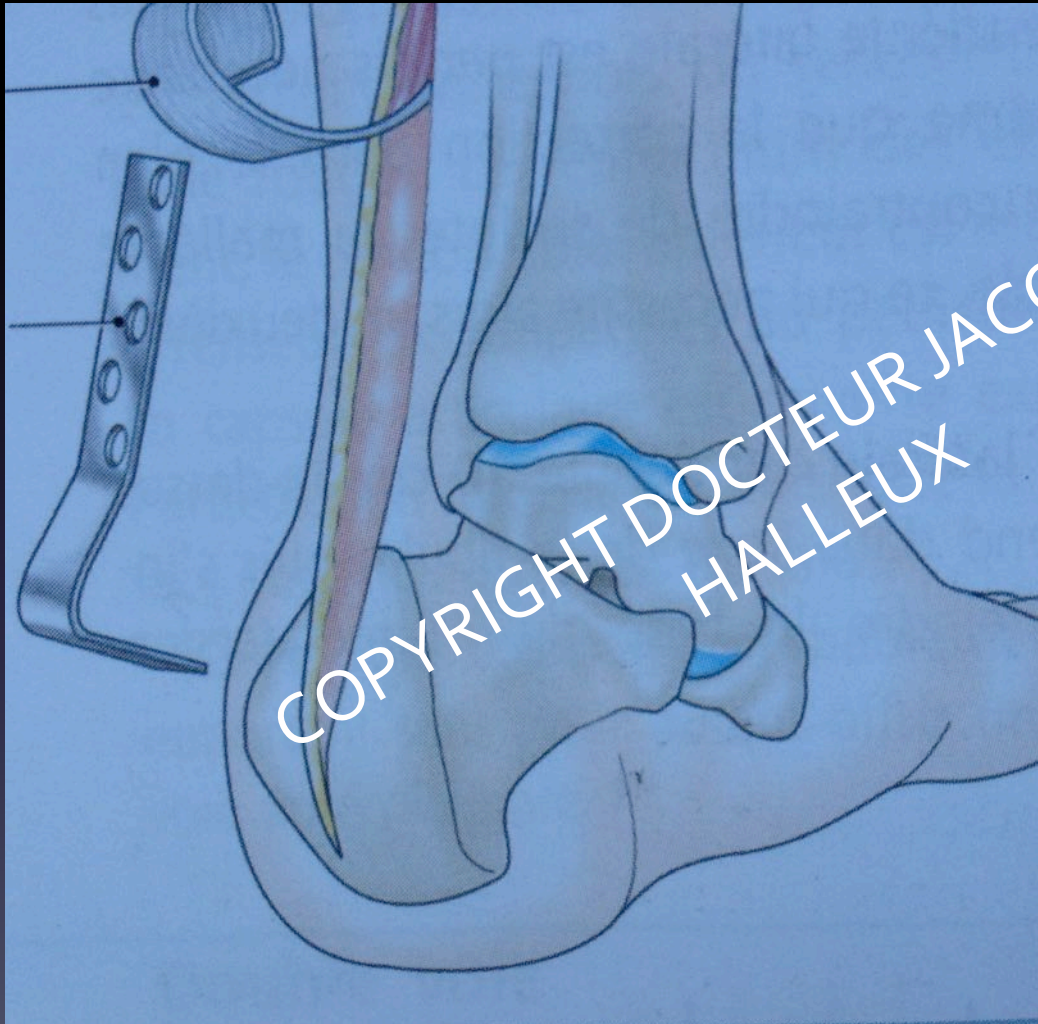
LATERAL APPROACH (Adams, Mann) fibula resection

- more complications
(infections, pseudarthrosis,
nerve lesion (NFS, NS), lesion
art fib perforans



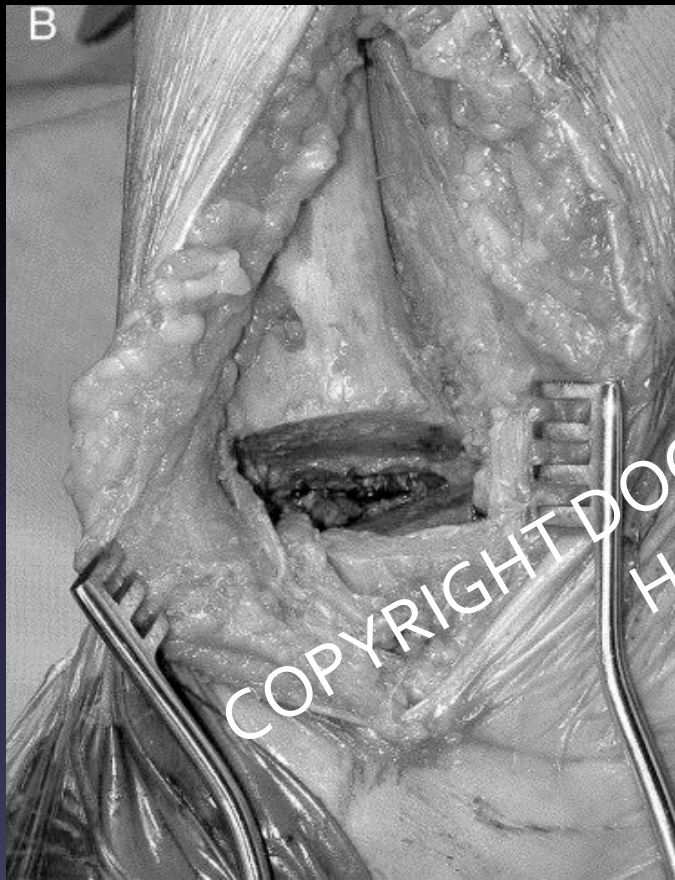
- Mann (no nerve lesions,
excellent exposure,
better fusion with fibula graft

SURGICAL APPROACH



POSTERIOR APPROACH
Infected pseudarthrosis

SURGICAL APPROACH



MEDIAL APPROACH (Schuberth)

- good exposure
- art/ nerv tib post!
- better fixation (*better tibial bone quality in posteromedial than posterolateral*)

Schuberth J, The medial malleolar approach for arthrodesis of the ankle: A report of 13 cases, *Journal of Foot and Ankle Surgery*, Vol 44, Issue 2, 125-132, March 2005

SURGICAL APPROACH

ARTHROSCOPY



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- Easy technique if surgeon is experienced in arthroscopy.
- Less wound problems; Faster union than open arthrodesis *
- Lesser pseudarthrosis **
- Shorter hospital stay, but complication, surgical time and RX alignment similar in open /arthroscopic group***
- **Contraindications:**
 - Deformities
 - necrosis

* Myerson M , Ankle arthrodesis. A comparison of an arthroscopic and an open method of treatment, Clin Orthop Relat Res. 1991 Jul; (268):84-95
** Zvijac Jeand all , Analysis of arthroscopically assisted ankle arthrodesis. Arthroscopy 2002;18:70-5.
*** Townshend D and all, arthroscopic versus open ankle arthrodesis: a multicenter comparative case seris, JBJS, january 16, 2013

FIXATION

SCREWS

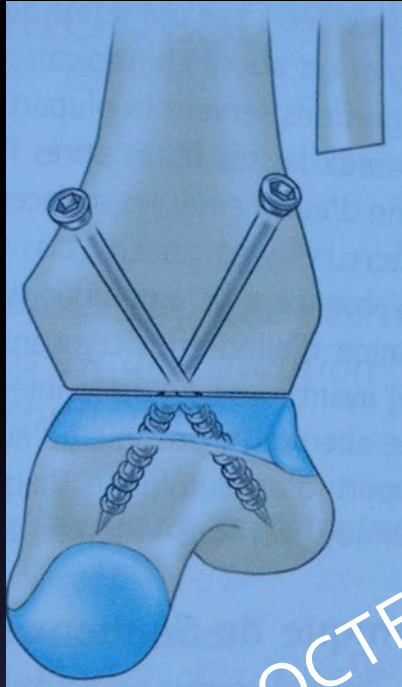
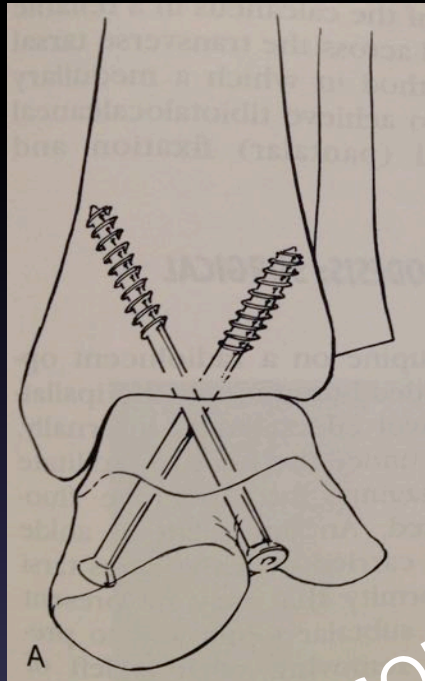
- Medial and lateral * : - as vertical as possible: 30° to tibia
- threads distal to arthrodesis site
- Third screw: anterior or posterior **
 - Better rotational stability
 - Lower rate of malunion / nonunion

PLATES

- If screws not possible (bone defect, bone necrosis)

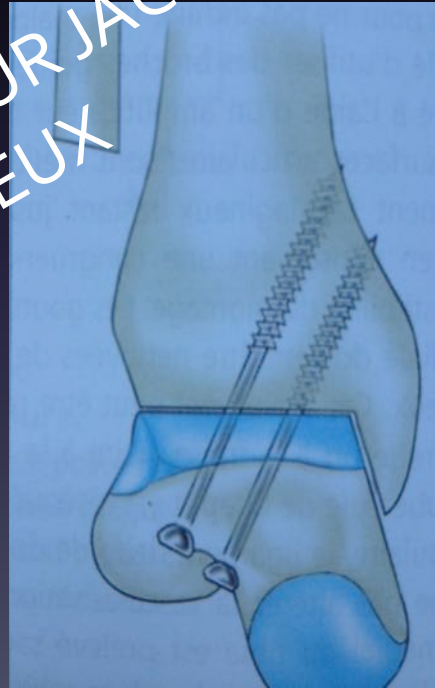
* Holt ES Ankle arthrodesis using internal screw fixation., Clin Orthop, 268:21-8, 1991

** Ogilvie-Harris, Arthrodesis of the ankle: a comparison of two versus three screw fixation in a crossed configuration, Clin Orthop relat Res, July 1994

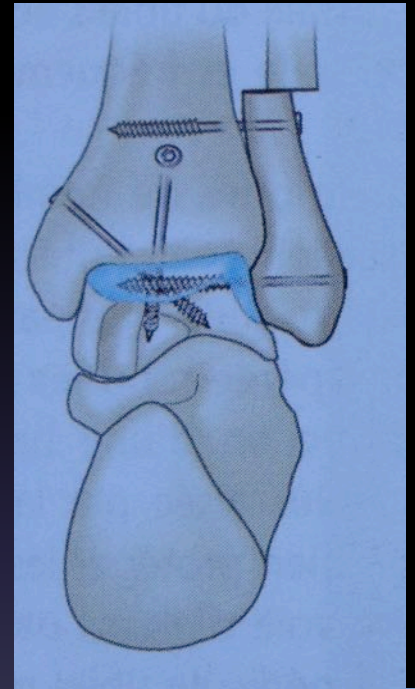


Myerson

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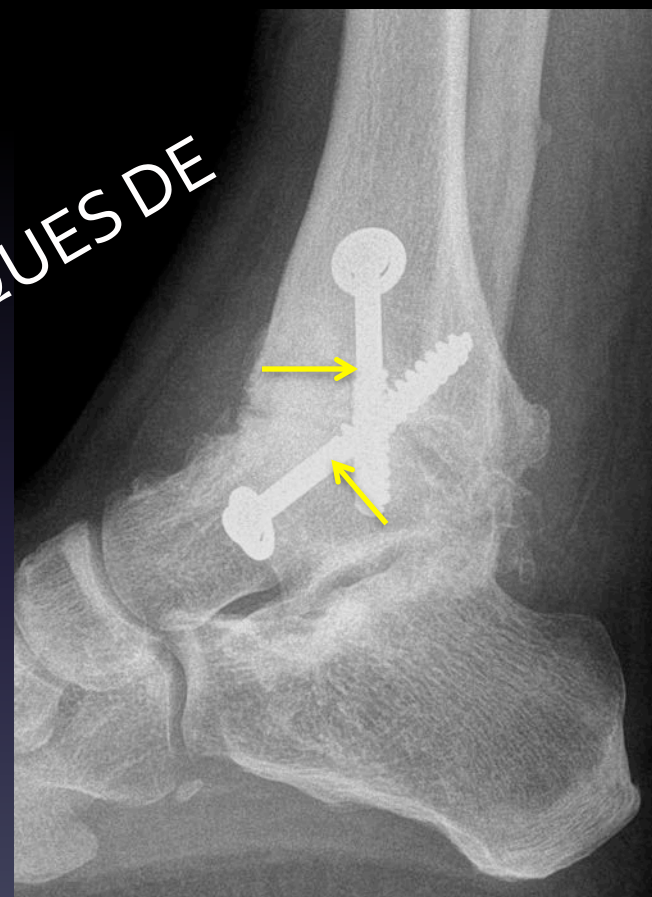
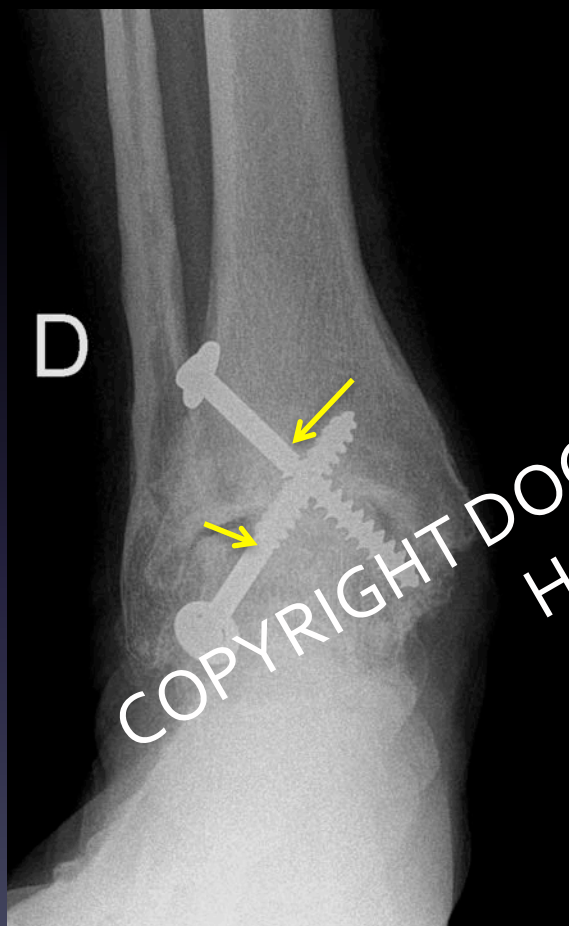


Mann

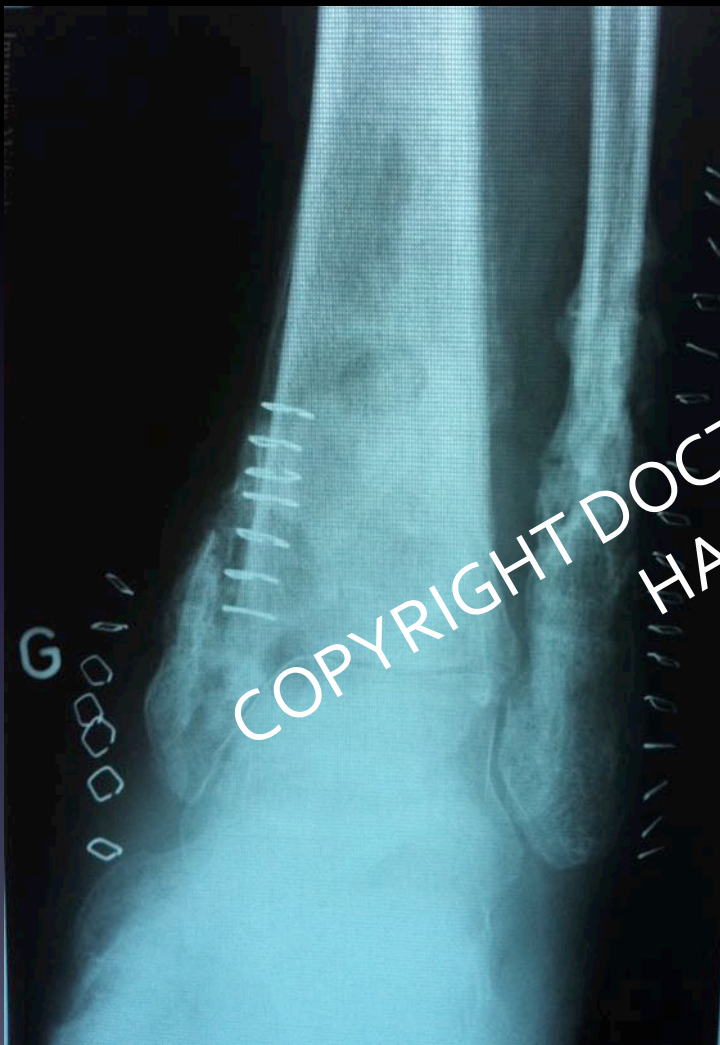


Holt

threads distal to arthrodesis site!



Case 1







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GH SLAINE

RX cheville gau
2011.12.07 09:35



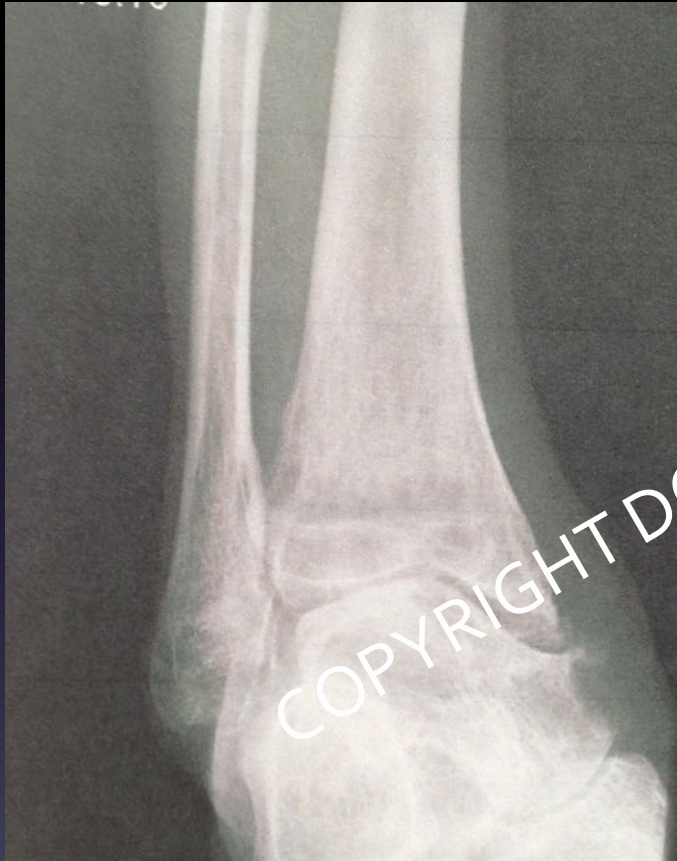
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DANIEL LILIANE GH SLAINE
PID 414134185
1953.04.08



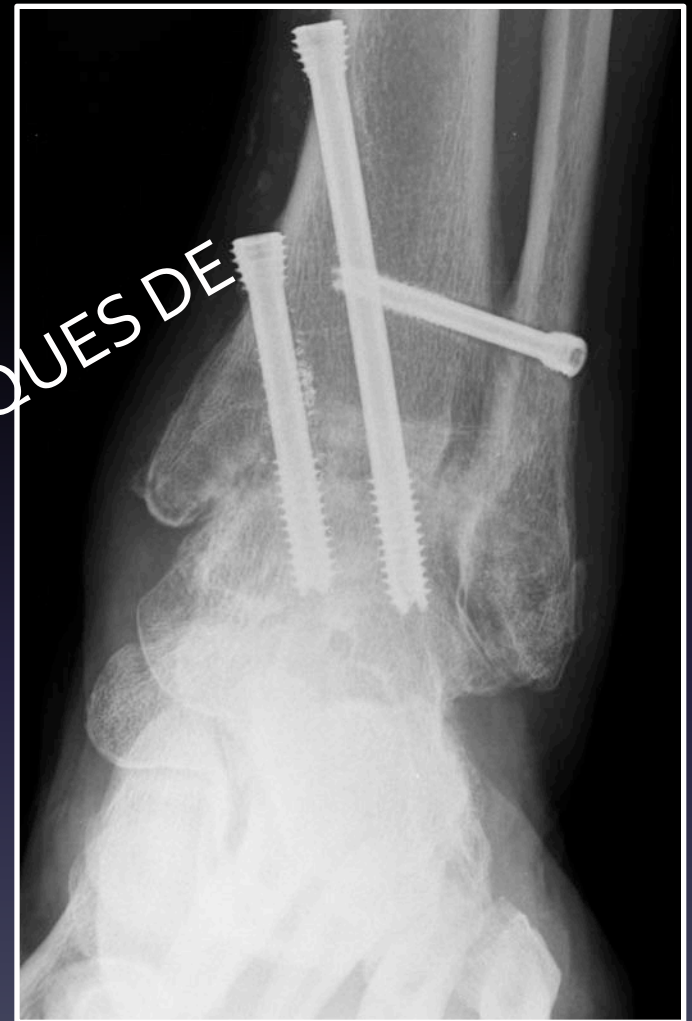
Case 2

Transfibular approach



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Case 3 : arthroscopy



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Is the degree of deformity still an issue?

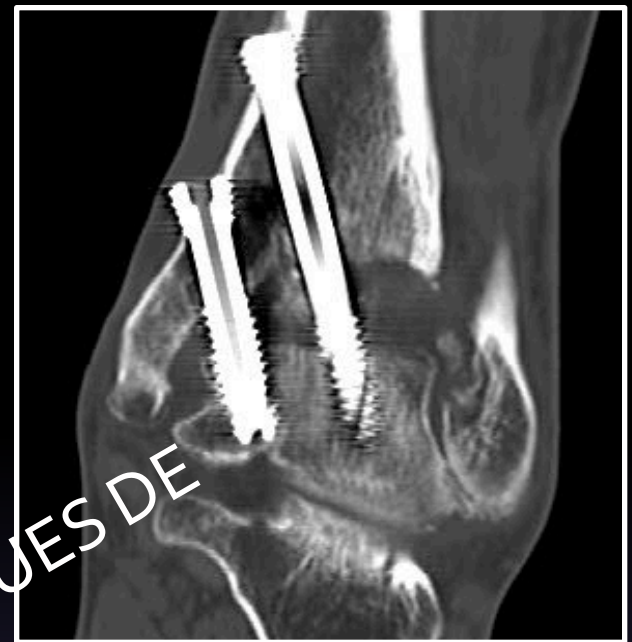
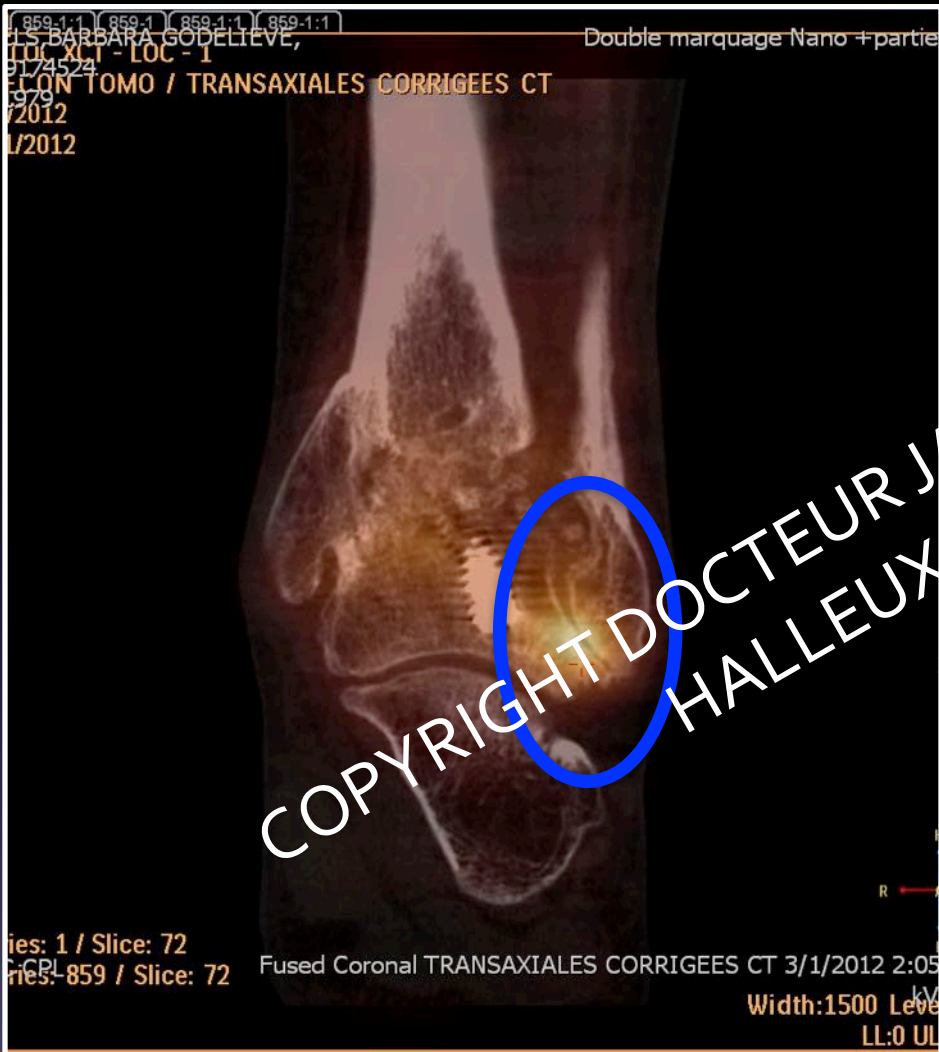
Arthroscopy Learning curve++

Case 4 : arthroscopy



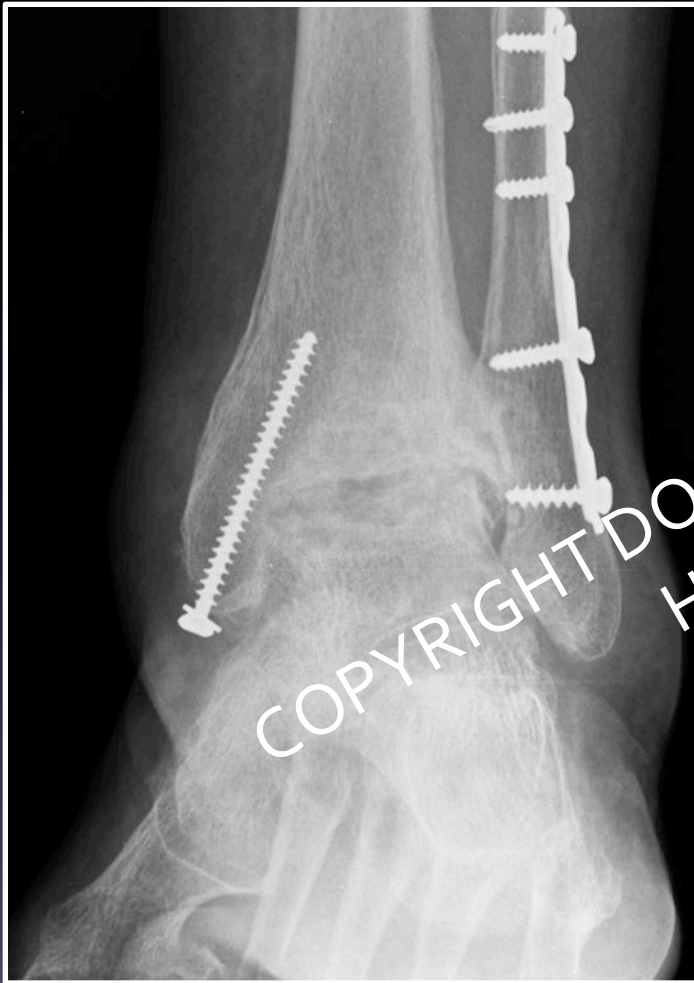
Arthroscopic arthrodesis
Necrosis tibial plafond





Case 5

is necrosis of tibial plafond a contrindication for arthroscopic arthrodesis?



Cave the presence of necrosis of the tibial plafond

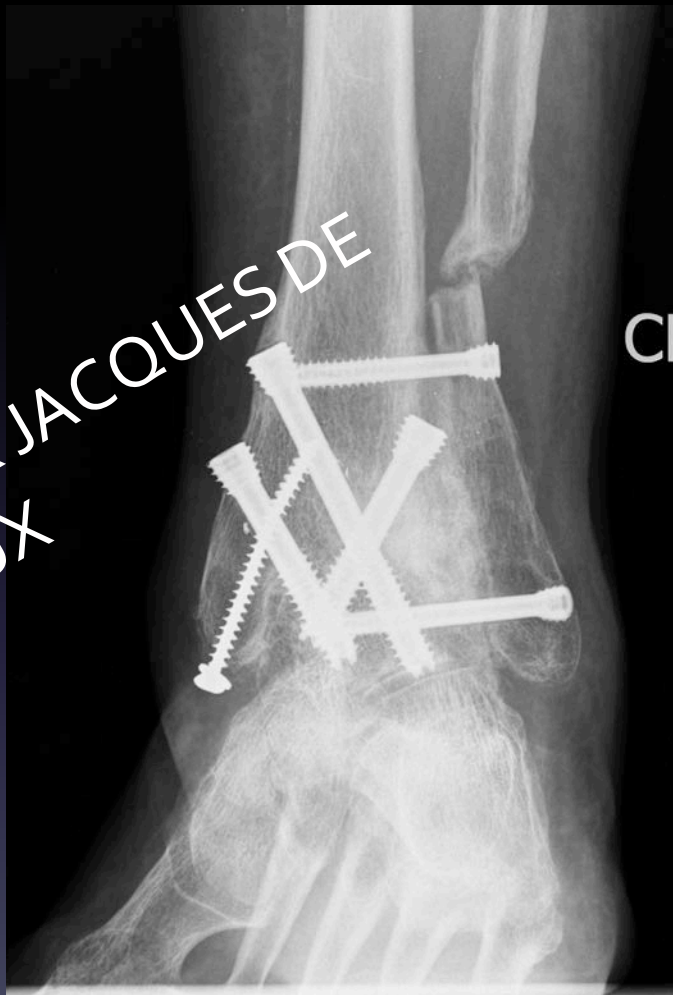


Cave the presence of necrosis of the tibial plafond



Cave the need for major bone grafting

Cave the presence of necrosis of the tibial plafond



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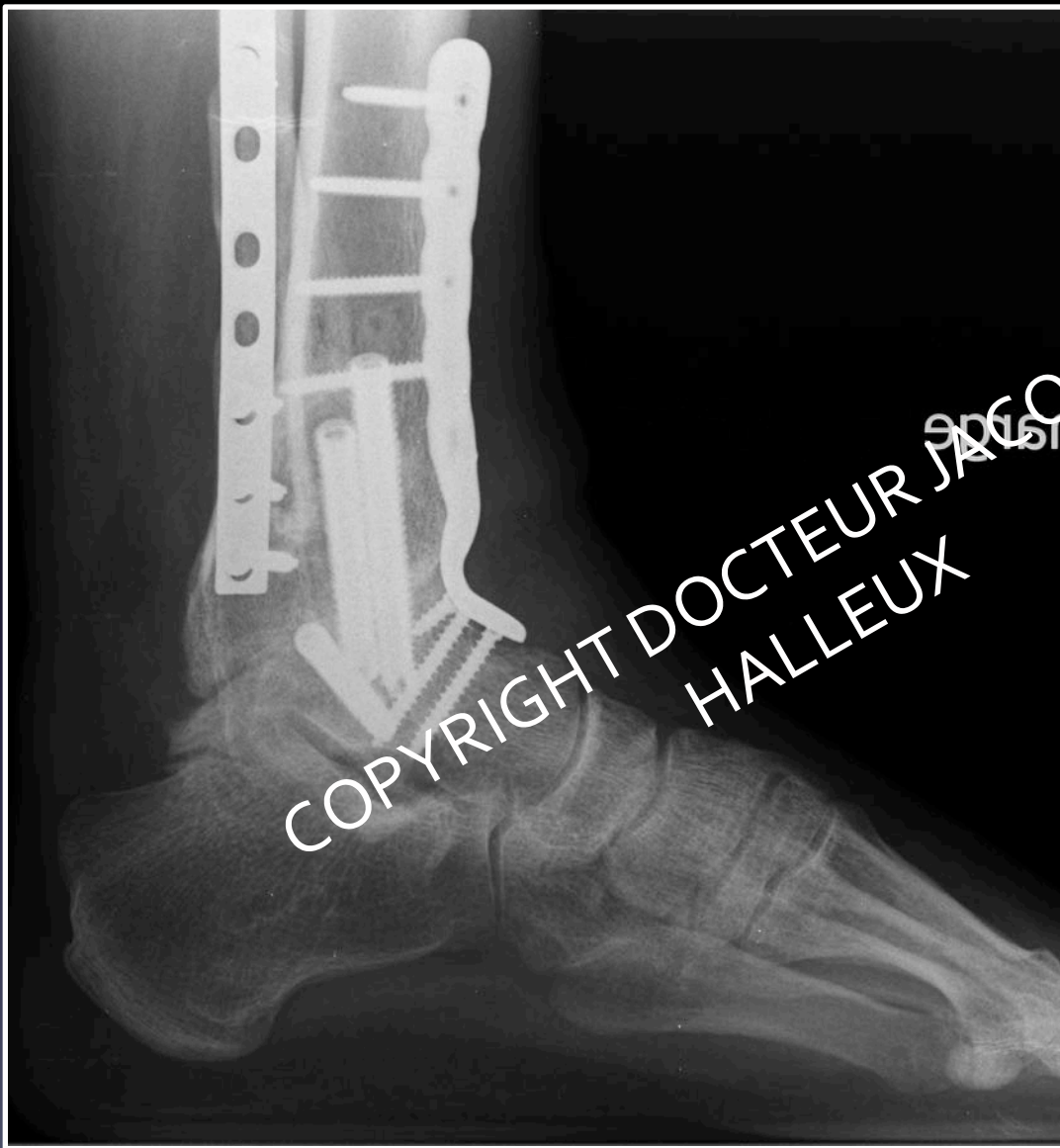
Case 6

When to use a plate versus screws



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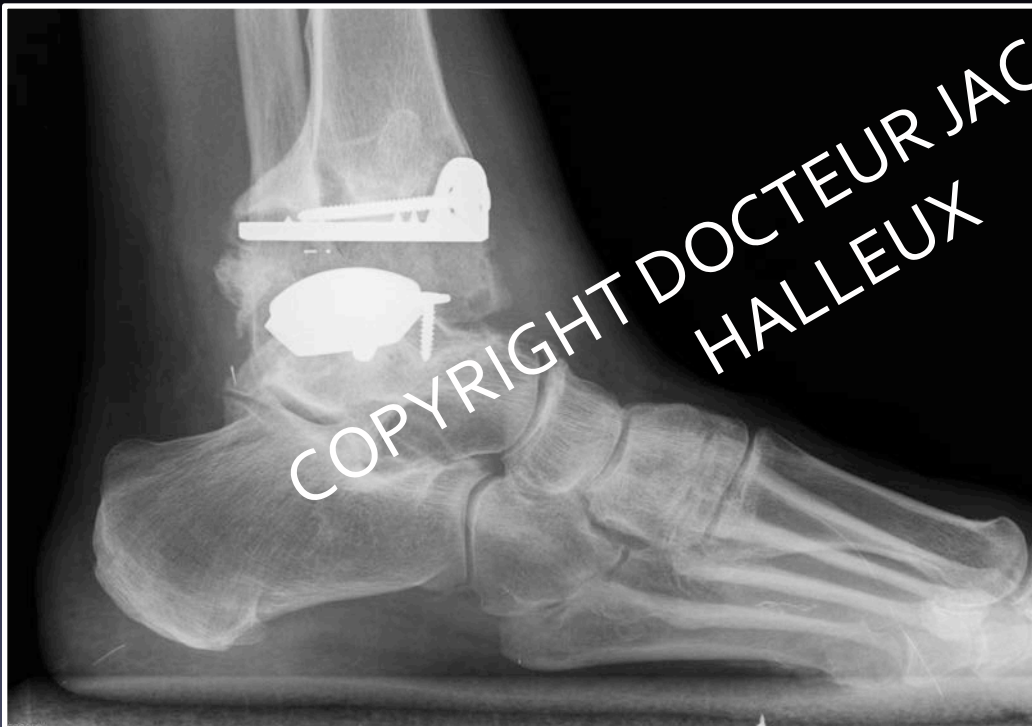
When to use a plate versus screws



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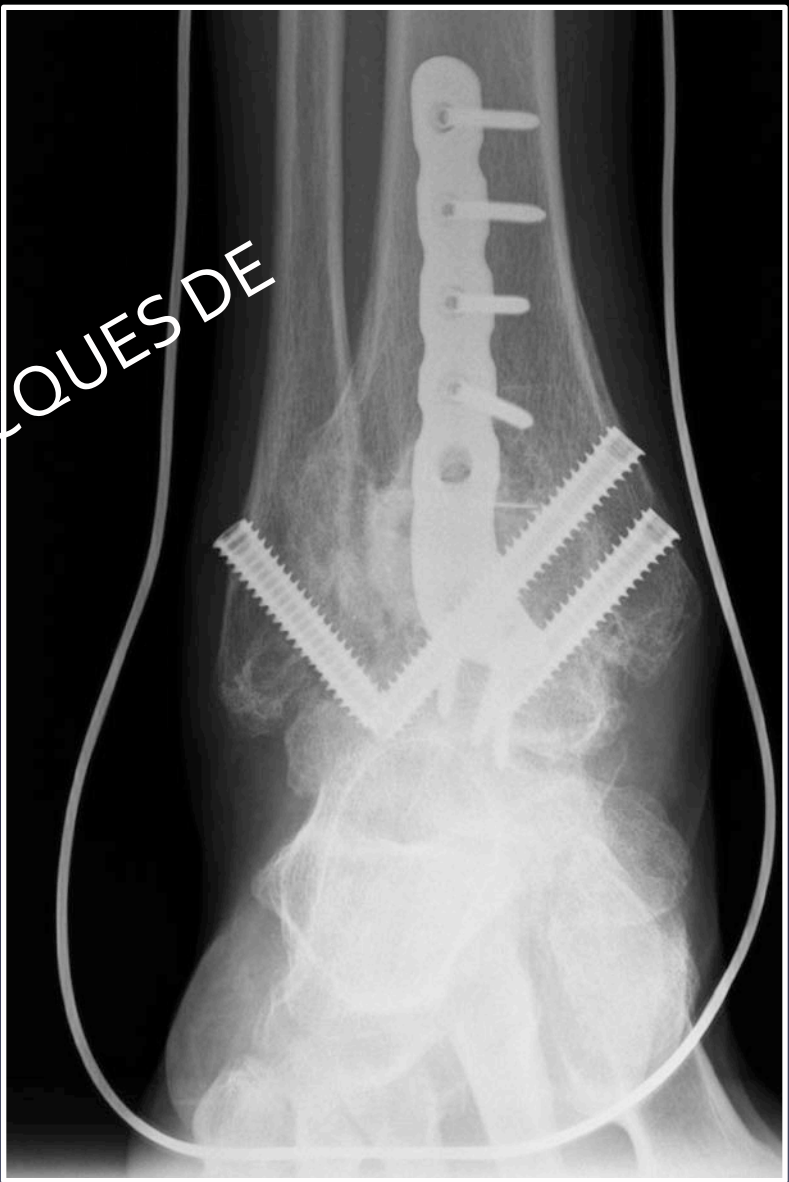
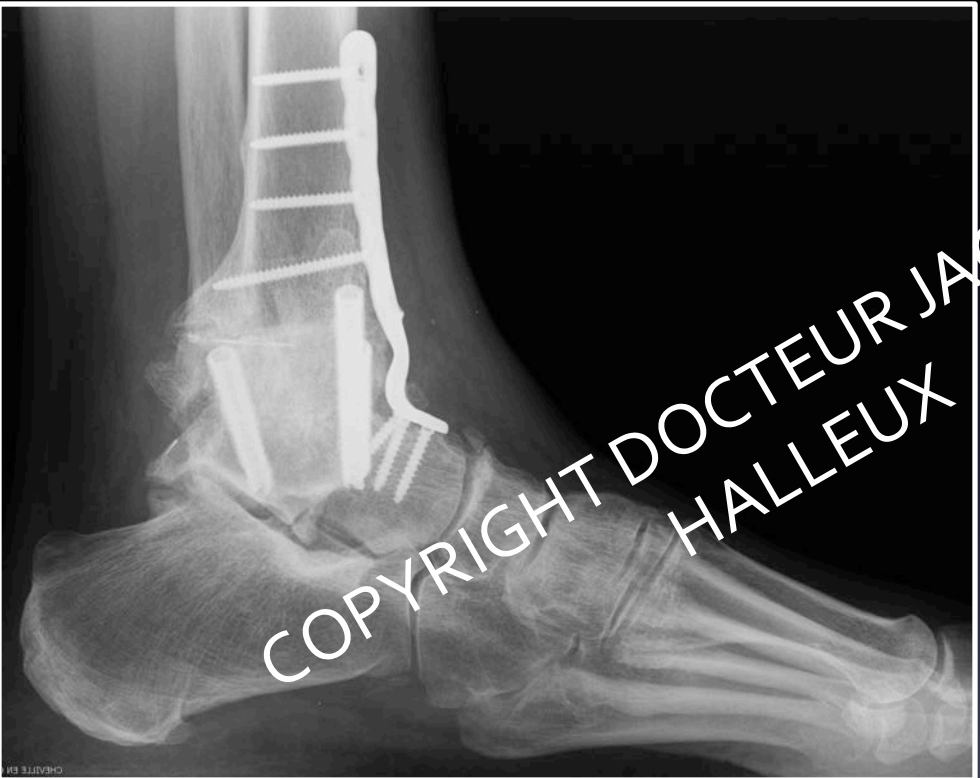
Case 7

When to use a plate versus screws



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When to use a plate versus screws



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CONCLUSION

Which Positioning ?

- neutral, 5° valgus, 5-10° external rotation

Which Technique/Approach?

- depending on the case
- the experience of the surgeon

Which Fixation?

- screws
- plate if necrosis or bone defect

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FALLEIX

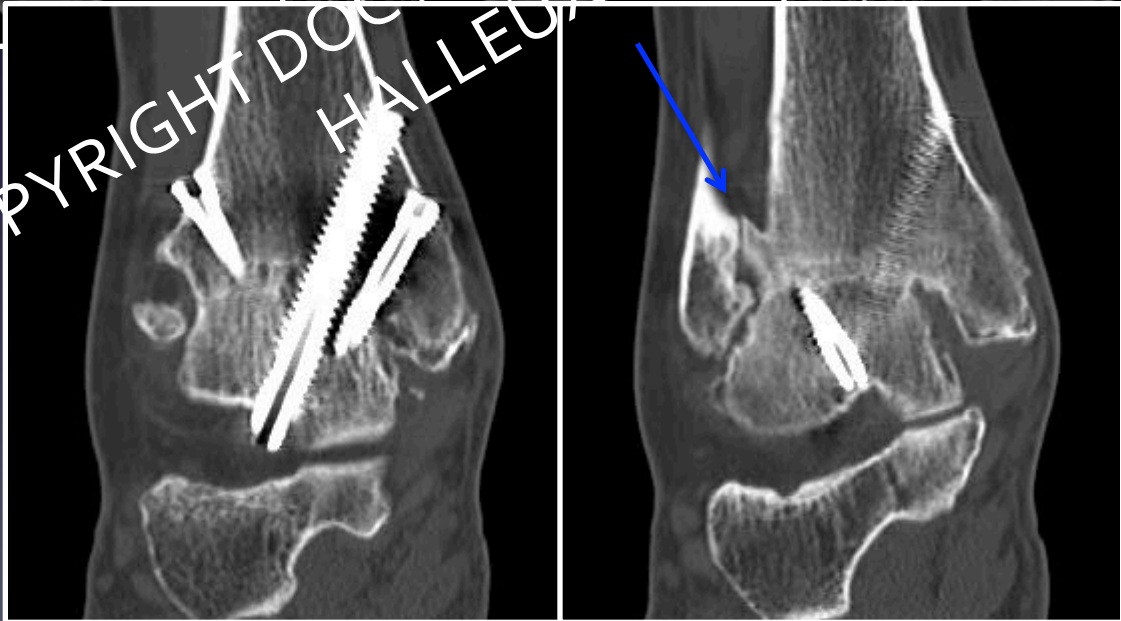
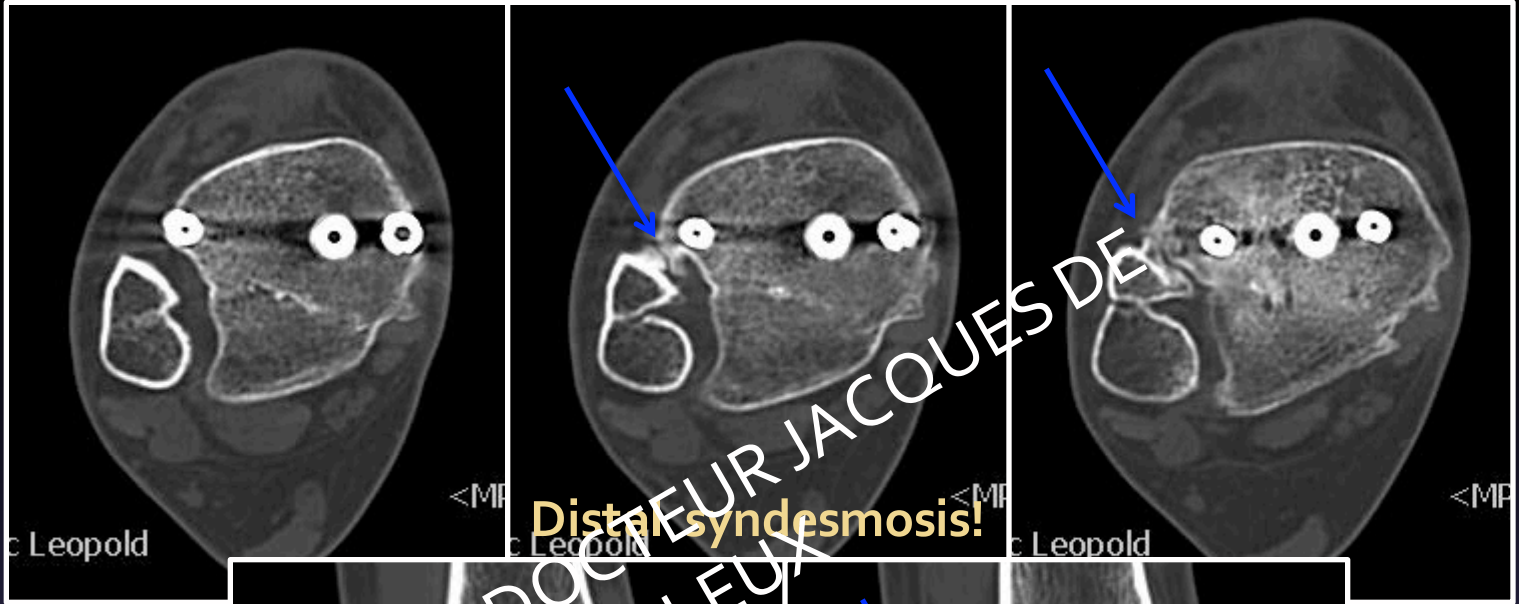
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Case 5 : arthroscopy

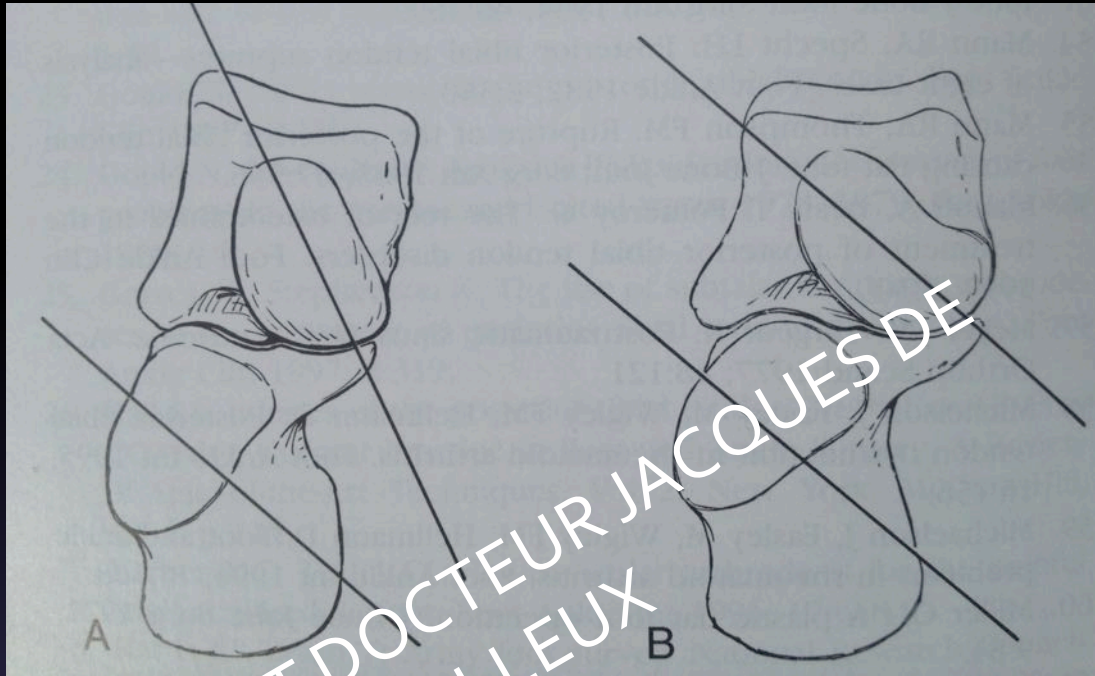


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BIOMECHANICAL CONSIDERATIONS

during the stance phase gait



1. Heel strike: inversion of the heel

- axes talus and calcaneus less parallel to each other
- more rigidity to receive initial load

2. Body weight forward: eversion of the heel

- axes talus and calcaneus more parallel to each other
- more flexibility

3. Push-off: inversion (idem)